

## DIRECT TESTIMONY OF PAUL R. MOUL

1           Pages 1 and 2 of Schedule 9 provide the recent history of long-term public utility bond  
2           yields for each of the "investment grades" (i.e., Aaa, Aa, A and Baa). The four rating categories  
3           shown on Schedule 9 are generally regarded as eligible for bank investments under commercial  
4           banking regulations. These investment grades are distinguished from "junk" bonds which have  
5           ratings of Ba and below.

6           A relatively long history of the spread between the yields on long-term A rated public  
7           utility bonds and long-term Treasury bonds is shown on page 3 of Schedule 9. There, it is shown  
8           that the spread in these yields declined after the 1987 stock market crash. Those spreads  
9           stabilized at about the one percentage point level for the years 1992 through 1997. With the  
10          aversion to risk and flight to quality described earlier, a significant widening of the spread in the  
11          yields between corporate (e.g., public utility) and Treasury bonds developed in 1998, after an  
12          initial widening that began in the fourth quarter of 1997. As shown on page 4 of Schedule 9, the  
13          spread in yields between A rated public utility bonds and 30-year Treasury bonds widened from  
14          about one percentage point to about one and three-quarters percentage points. The significant  
15          widening of spreads in 1998 was unexpected by some technically savvy investors, as shown by  
16          the debacle at the Long-Term Capital Management hedge fund. When Russia defaulted its debt  
17          on August 17, some investors had to cover short positions when Treasury prices spiked upward.  
18          Short-covering by investors that guessed wrong on the relationship between corporate and  
19          Treasury bonds also contributed to run-up in Treasury bond prices by increasing the demand for  
20          them. This helped to contribute to a widening of the spreads between corporate and Treasury  
21          bonds.

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1           As indicated by the dynamics described earlier, there has been a realignment of the  
2 previous relationship between the yields on corporate debt and Treasury bonds. That is to say,  
3 the decline in Treasury bond yields in 1998 did not translated into similar declines for A rated  
4 public utility bonds because there has been a disproportionate change in those yields. In essence,  
5 the cost of corporate debt and equity reflects more risk than formerly existed by reference to the  
6 yields on long-term Treasury bonds.

7           For the four quarters ended December 1999, the average of the daily yields for A rated  
8 public utility bonds was 7.63% and the median was 7.72%. The overall range of yields was  
9 8.28% to 6.92% which provided a midpoint yield of 7.60%. The distribution of the yields was:  
10 6% of the daily yields were less than 7.00%, 31% of the daily yields were between 7.00% and  
11 7.49%, 46% of the daily yields were between 7.50% and 7.99%, and 17% of the yields were  
12 over 8.00%. By year-end 1999, the yield on A rated public utility bonds was 8.26%, a 1.33%  
13 increase over the year-end 1998 yield.

14 **Q. What long-term public utility debt cost rate did you use in your risk premium analysis?**

15 **A.** I have recognized in my selection of a long-term public utility bond yield the present situation  
16 that shows that the spread between the yields of Treasury and corporate bonds has continued to  
17 persist above historical levels. Recognizing this fact, I have determined the forecast yields on  
18 A rated public utility debt by using the Blue Chip Financial Forecasts ("Blue Chip") along with  
19 the spread in yields that I describe above. The Blue Chip Financial Forecasts is published  
20 monthly and contains consensus forecasts of a variety of interest rates compiled from a panel of  
21 45 banking, brokerage, and investment advisory services. In early 1999, Blue Chip stopped

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publishing forecasts of yields on A rated public utility bonds because the Fed deleted these yields from its Statistical Release H.15. To independently project a forecast of the yields on A rated public utility bonds, I have combined the forecast yields on thirty-year Treasury bonds published by Blue Chip on March 1, 2000 and the yield spread of 1.75% that I describe above. For comparative purposes, I have also shown the Blue Chip Financial Forecasts of Aaa rated and Baa rated corporate bonds. These forecasts are:

| Quarter       | Blue Chip Financial Forecasts |           |          | A-rated Utility |       |
|---------------|-------------------------------|-----------|----------|-----------------|-------|
|               | Corporate bonds               |           | 30-Year  | Spread          | Yield |
|               | Aaa rated                     | Baa rated | Treasury |                 |       |
| 1st Qtr. 2000 | 7.7%                          | 8.4%      | 6.4%     | 1.75            | 8.15% |
| 2nd Qtr. 2000 | 7.7                           | 8.4       | 6.4      | 1.75            | 8.15  |
| 3rd Qtr. 2000 | 7.7                           | 8.5       | 6.4      | 1.75            | 8.15  |
| 4th Qtr. 2000 | 7.6                           | 8.4       | 6.3      | 1.75            | 8.05  |
| 1st Qtr. 2001 | 7.6                           | 8.3       | 6.3      | 1.75            | 8.05  |
| 2nd Qtr. 2001 | 7.6                           | 8.3       | 6.2      | 1.75            | 7.95  |

Given these forecasts an 8.00% yield on A rated public utility bonds represents a reasonable expectation.

In contrast, the historical yields for long-term public utility debt are shown graphically on page 1 of Schedule 9. For the twelve months ending January 2000, the average monthly yield on Moody's A rated index of public utility bonds was 7.74% as shown on page 2 of Schedule 9. As previously described, there was generally an upward trend in public utility bond yields throughout the period. Indeed, the yields increased from 7.09% in February 1999 to 8.35% in January 2000. As described above, there has been a disconnection in recent quarters, from the previous relationship of yields on Treasury bonds and public utility bonds. Currently, the yield spread has persisted at a level of about 1.75 percentage points even though most of the

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1 fundamentals, other than the shrinking supply of new Treasury issues, that original precipitated  
2 the widening of the spread has subsided.

3 **Q. How have you determined the equity risk premium?**

4 A. The equity risk premium is determined as the difference in the rate of return on debt capital and  
5 the rate of return on common equity. Because the common equity holder has only a residual  
6 claim on earnings and assets, there is no assurance that achieved returns on common equities will  
7 equal expected returns. This is quite different from returns on bonds, where the investor realizes  
8 the expected return during the entire holding period, absent default. It is for this reason that  
9 common equities are always more risky than senior debt securities. There are investment  
10 strategies available to bond portfolio managers that immunize bond returns against fluctuations  
11 in interest rates because bonds are redeemed through sinking funds or at maturity, whereas to  
12 no such redemption is mandated for public utility common equities.

13 It is well recognized that the expected return on more risky investments will exceed the  
14 required yield on less risky investments. Neither the possibility of default on a bond nor the  
15 maturity risk detract from the risk analysis, because the common equity risk rate differential (i.e.,  
16 the investor-required risk premium) is always greater than the return components on a bond. It  
17 should also be noted that the investment horizon is typically long-run for both corporate debt and  
18 equity, and that the risk of default (i.e., corporate bankruptcy) is a concern to both debt and  
19 equity investors. Thus, the required yield on a bond provides a benchmark or starting point with  
20 which to track and measure the cost rate of common equity capital.

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1   **Q. Does your choice of using corporate bond yields as a benchmark diminished the usefulness**  
2   **of your risk premium analysis?**

3   A. No. My decision to use corporate bond yields provides a reasonable basis to implement the risk  
4   premium approach because corporate bond yields provide a consistent benchmark to measure  
5   the cost of equity. Moreover, the realignment of the yields on Treasury bonds and corporate  
6   bonds provides additional support for using the corporate bond interest rate benchmark. There  
7   is no need to segment the bond yield according to its components, because it is the total return  
8   demanded by investors that is important for determining the risk rate differential for common  
9   equity. This is because the complete bond yield provides the basis to determine the differential,  
10   and as such, consistency requires that the computed differential must be applied to the complete  
11   bond yield when applying the risk premium approach. To apply the risk rate differential to a  
12   partial bond yield would result in a misspecification of the cost of equity because the computed  
13   differential was initially determined by reference to the entire bond return.

14   **Q. What measures have you used to determine the equity risk premium?**

15   A. The risk rate differential between the cost of equity and the yield on long-term corporate bonds  
16   can be determined by reference to a comparison of holding period returns (here defined as one  
17   year) computed over long time spans. This analysis assumes that over long periods of time  
18   investors' expectations are on average consistent with rates of return actually achieved.  
19   Accordingly, historical holding period returns must not be analyzed over an unduly short period  
20   because near-term realized results may not have fulfilled investors' expectations. Moreover,  
21   specific past period results may not be representative of investment fundamentals expected for

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1 the future. This is especially apparent when the holding period returns include negative returns  
2 which are not representative of either investor requirements of the past or investor expectations  
3 for the future. The short-run phenomenon of unexpected returns (either positive or negative)  
4 demonstrates that an unduly short historical period would not adequately support a risk premium  
5 analysis. It is important to distinguish between investors' motivation to invest, which encompass  
6 positive return expectations, and the knowledge that losses can occur. No rational investor  
7 would forego payment for the use of capital, or expect loss of principle, as a basis for investing.  
8 Investors will hold cash rather than invest with the expectation of a loss.

9 The risk rate differentials for all equities, as measured by the S&P Composite, are  
10 established by reference to long-term corporate bonds. For public utilities, the risk rate  
11 differentials are computed with the S&P Public Utilities as compared with public utility bonds.  
12 Page 1 of Schedule 10 provides the historical holding period returns for the S&P Public Utility  
13 Index which has been independently computed by me and the historical holding period returns  
14 for the S&P Composite Index which have been reported in Stocks, Bonds, Bills and Inflation  
15 published by Ibbotson & Associates. The tabulation begins with 1928 because January 1928 is  
16 the earliest monthly dividend yield for the S&P Public Utility Index. I have considered all reliable  
17 data for this study to avoid the introduction of a particular bias to the results. The measurement  
18 of the common equity return rate differential is based upon actual capital market performance  
19 using realized results. As a consequence, the underlying data for this risk premium approach can  
20 be analyzed with a high degree of precision. Informed professional judgment is required only  
21 to interpret the results of this study, but not to quantify the component variables.

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1           The measurement procedure used to summarize the risk rate differentials consisted of  
2           arithmetic means, geometric means, and medians for each asset series. Measures of central  
3           tendency of the results from the historical periods provide the best indication of representative  
4           rates of return. In regulated ratesetting, the correct measure of the equity risk premium is the  
5           arithmetic mean because a utility must expect to earn its cost of capital in each year in order to  
6           provide investors with their long-term expectations. In other contexts, such as pension  
7           determinations, compound rates of return, as shown by the geometric means, may be  
8           appropriate. The median returns are also appropriate in ratesetting because they are a measure  
9           of the central tendency of a single period rate of return. Median values have also been  
10          considered in this analysis because they provide a return which divides the entire series of annual  
11          returns in half and are representative of a return that symbolizes, in a meaningful way, the central  
12          tendency of all annual returns contained within the analysis period. Medians are regularly  
13          included in many investor-influencing publications.

14          As previously noted, the arithmetic mean provides the appropriate point estimate of the  
15          risk premium. To supplement my analysis, I have also used the rates of return taken from the  
16          geometric mean and median for each series to provide the bounds of the range to measure the  
17          risk rate differentials. This further analysis shows that when selecting the midpoint from a range  
18          established with the geometric means and medians, the arithmetic mean is indeed a reasonable  
19          measure for the long-term cost of capital. For the years 1928 through 1999, the risk premiums  
20          for each series are:

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|                   | <u>S&amp;P<br/>Composite</u> | <u>S&amp;P<br/>Public Utilities</u> |
|-------------------|------------------------------|-------------------------------------|
| Arithmetic Mean   | <u>7.07%</u>                 | <u>5.28%</u>                        |
| Geometric Mean    | 5.46%                        | 3.44%                               |
| Median            | <u>12.90%</u>                | <u>6.90%</u>                        |
| Midpoint of Range | <u>9.18%</u>                 | <u>5.17%</u>                        |
| Average           | <u>8.13%</u>                 | <u>5.23%</u>                        |

The empirical evidence suggests that the common equity risk premium is higher for the S&P Composite Index compared to the S&P Public Utilities.

**Q. Why have you used the S&P Public Utilities to measure the risk premium for a water utility rather than a broader market index?**

**A.** The S&P Public Utility index contains companies that are more closely aligned with the water utility industry than some broader market index, such as the S&P 500 Composite index. Use of the S&P Public Utility index reduces the role of subjective judgment in establishing the risk premium for the water utilities. It should be recognized that the S&P Public Utility index is a subset of the overall S&P 500 Composite index. The S&P Public Utility index is intended to represent firms engaged in regulated activities and today is comprised of electric companies and gas companies. With the equity risk premiums developed for the S&P Public Utilities as a base, I derived the equity risk premium for the Water Group and the Public Utility Group.

**Q. What equity risk premium for the S&P Public Utilities have you determined for this case?**

**A.** To develop an appropriate risk premium, I analyzed the results for the S&P Public Utilities by averaging (i) the midpoint of the range shown by the geometric mean and median and (ii) the

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1 arithmetic mean. This procedure has been employed to provide a comprehensive way of  
2 measuring the central tendency of the historical returns. By taking this comprehensive approach,  
3 I have avoided overemphasizing any particular measure that many tend to provide a particular  
4 result (e.g., the geometric mean would understate the required return if it was used exclusively).  
5 Moreover, by considering a variety of measures of central tendency, the resulting risk premium  
6 can be viewed as a conservative representation of investor expectations (e.g., the risk premium  
7 that I have developed is lower than that shown by use of the arithmetic mean alone). As shown  
8 by the values indicated on page 2 of Schedule 10, the indicated risk premiums for the various  
9 time periods analyzed are 5.23% (1928-1999), 6.08% (1952-1999), 5.23% (1974-1999), and  
10 5.31% (1979-1999).

11 **Q. Can you further explain the time periods that you selected in your equity risk premium**  
12 **determination?**

13 **A.** Yes. Specific historical periods were analyzed in order to match more closely historical  
14 fundamentals with current expectations. The results are provided on page 2 of Schedule 10.  
15 One of these sub-periods included the 48-year period, 1952-1999. These years follow the  
16 historic 1951 Treasury-Federal Reserve Accord which affected monetary policy and the market  
17 for government securities.

18 A further investigation was undertaken to determine whether a realignment has taken  
19 place subsequent to the historic 1973 Arab Oil embargo and during the deregulation of the  
20 financial markets. In each case, the public utility risk premiums were computed by using the  
21 arithmetic mean, and the geometric means and medians to establish the range shown by those

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1 values. The time periods covering the more recent periods 1974 through 1999 and 1979 through  
2 1999 contain events subsequent to the initial oil shock and the advent of monetarism as Fed  
3 policy, respectively. For the 48-year, 26-year and 21-year periods, the public utility risk  
4 premiums were 6.08%, 5.23%, and 5.31% respectively, as shown by the average of the specific  
5 point-estimates and the midpoint of the ranges provided on page 2 of Schedule 10.

6 **Q. Does this process provide an objective way of analyzing these data?**

7 **A.** Yes. The selection of specific periods taken from the entire historical series is designed to  
8 capture market performance that occurred subsequent to specific events. That is to say, the  
9 subperiods that I analyzed reflected market fundamentals that were influenced by landmark  
10 events that altered the basic framework of investor expectations on a going forward basis. The  
11 year 1952 represents the landmark Treasury-Federal Reserve Accord, 1974 was the year of the  
12 Arab oil embargo, and 1979 began the deregulation of the U.S. financial markets. These events  
13 were fixed in history and cannot be manipulated as later financial data becomes available. That  
14 is to say, using the Treasury-Federal Reserve Accord as a defining event, the year 1952 is fixed  
15 as the beginning point for the measurement period regardless of the financial results that  
16 subsequently occurred. After selecting the initial year that contained the defining event described  
17 above, all subsequent years were considered through the terminal year of my analysis which was  
18 represented by the most recent calendar year of data which was available at the time this  
19 testimony was prepared. Hence, all historical periods include data through 1999. As such,  
20 additional data is merely added to the earlier results when it becomes available, clearly showing  
21 that the periods chosen were not driven by the desired results of the study.

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1   **Q.   What conclusions have you drawn from these data?**

2   **A.**Using the summary values provided on page 2 of Schedule 10, the 1928-1999 period provides  
3       the lowest indicated risk premium, while the 1952-1999 period provides the highest risk premium  
4       for the S&P Public Utilities. Within these bounds, a common equity risk premium of 5.27%  
5       ( $5.23\% + 5.31\% = 10.54\% \div 2$ ) is shown from the more recent data covering the periods 1974-  
6       1999 and 1979-1999. Therefore, 5.27% represents a reasonable risk premium for the S&P  
7       Public Utilities in this case.

8           As noted earlier in my fundamental risk analysis, differences in risk characteristics must  
9       be taken into account when applying the results for the S&P Public Utilities to the Water Group  
10      and Public Utility Group. I recognized these differences in the development of the equity risk  
11      premium in this case. I previously enumerated various differences in fundamentals including:  
12      size, market ratios, common equity ratio, return on book equity, operating ratios, coverage,  
13      quality of earnings, internally generated funds, and betas. In my opinion, these differences  
14      indicate that 4.25% represents a reasonable common equity risk premium for the Water Group.  
15      This represents approximately 81% ( $4.25\% \div 5.27\% = .81$ ) of the risk premium of the S&P  
16      Public Utilities. Following the same procedure for the Public Utility Group indicates a somewhat  
17      higher 4.75% common equity risk premium. This represents approximately 90% ( $4.75\% \div$   
18       $5.27\% = .88\%$ ) of the risk premium of the S&P Public Utilities.

19   **Q.   What common equity cost rate would be appropriate using this equity risk premium and**  
20   **the yield on long-term public utility debt?**

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1 A. The cost of equity (i.e., " $k$ ") is represented by the sum of the prospective yield for long-term  
2 public utility debt (i.e., " $i$ ") and the equity risk premium (i.e., " $RP$ "). The Risk Premium  
3 approach provides a cost of equity of:

$$\begin{array}{rcccl} & i & + & RP & = & k \\ \text{Water Group} & 8.00\% & + & 4.25\% & = & 12.25\% \\ \text{Public Utility Group} & 8.00\% & + & 4.75\% & = & 12.75\% \end{array}$$

7 Again, the cost rates have not been adjusted for common stock financing costs.

### CAPITAL ASSET PRICING MODEL

9 Q. How have you used the Capital Asset Pricing Model to measure the cost of equity in this  
10 case?

11 A. I used the Capital Asset Pricing Model ("CAPM") in addition to my other methods, as each will  
12 complement the other and will provide a result which will alleviate the unavoidable shortcomings  
13 found in each method. The CAPM is based on modern portfolio theory which provides a  
14 theoretical explanation of expected returns on portfolios of securities. The Capital Asset Pricing  
15 Model ("CAPM") attempts to describe the way prices of individual securities are determined in  
16 efficient markets where information is freely available and is reflected instantaneously in security  
17 prices. The CAPM states that the expected rate of return on a security is determined by a risk-  
18 free rate of return plus a risk premium which is proportional to the non-diversifiable (or  
19 systematic) risk of a security.

20 The CAPM theory has several unique assumptions that are not common to most other  
21 methods used to measure the cost of equity. As with other market-based approaches, the CAPM

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1 is an expectational concept. There has been significant academic research conducted that found  
2 that the empirical market line, based upon historical data, has a less steep slope and higher  
3 intercept than the theoretical market line of the CAPM. For equities with a beta less than 1.0,  
4 such as utility common stocks, the CAPM theoretical market line will underestimate the realistic  
5 expectation of investors in comparison with the empirical market line which shows that the  
6 CAPM may potentially misspecify investors' required return.

7 The CAPM considers changing market fundamentals in a portfolio context. The CAPM  
8 specifically accounts for differences in systematic risk (i.e., market risk as measured by the beta)  
9 between an individual firm or group of firms and the entire market of equities. The balance of  
10 the investment risk, or that characterized as unsystematic, must be diversified. Some argue that  
11 diversifiable (unsystematic) risk is unimportant to investors. But this contention is not  
12 completely justified because the business risk of an individual company, including regulatory risk,  
13 are widely discussed within the investment community and therefore influence investors in  
14 regulated firms. In addition, I note that the CAPM assumes that through portfolio  
15 diversification, investors will minimize the effect of the unsystematic (diversifiable) component  
16 of investment risk. Because it is not known whether the average investor holds a well diversified  
17 portfolio, the CAPM must also be used with other models of the cost of equity.

18 To apply the traditional CAPM theory, three inputs are required: the beta coefficient  
19 ( $\beta$ ), a risk-free rate of return ( $R_f$ ), and a market premium ( $R_m - R_f$ ) that represents the  
20 total return on the market of equities reduced by the risk-free rate of return. The cost of equity  
21 stated in terms of the CAPM is:

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$$k = R_f + \beta (R_m - R_f)$$

As previously indicated, it is important to recognize that the academic research has shown that the security market line was flatter than that predicted by the CAPM theory and it had a higher intercept than the risk-free rate. These tests indicated that for portfolios with betas less than 1.0, the traditional CAPM will understate the return for such stocks. Likewise, for portfolios with betas above 1.0, these companies had lower returns than indicated by the traditional CAPM theory. Once again, CAPM assumes that through portfolio diversification investors will minimize the effect of the unsystematic (diversifiable) component of investment risk. Therefore, the CAPM must also be used with other models of the cost of equity, especially when it is not known whether the average public utility investor holds a well diversified portfolio. In contrast, my Risk Premium approach also considers industry- and company-specific factors because it is not limited to measuring just systematic risk. As a consequence, my Risk Premium approach is more comprehensive than the CAPM. In addition, the Risk Premium approach provides a better measure of the cost of equity because it is founded upon the yields on corporate bonds rather than Treasury bonds. Due to the disconnection of the yields on corporate and Treasury bonds, the Risk Premium approach is preferable at this time.

**Q. What betas have you considered in the CAPM?**

**A.** The beta coefficient is a statistical measure which attempts to identify the non-diversifiable (systematic) risk of an individual security and measures the sensitivity of rates of return on a particular security with general market movements. Under the CAPM theory, a security that has a beta of 1.0 should theoretically provide a rate of return equal to the return rate provided by the

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1 market. When employing stock price changes in the derivation of beta, a stock with a beta of  
2 1.0 should exhibit a movement in price which would track the movements in the overall market  
3 prices of stocks. Hence, if a particular investment has a beta of 1.0, a one percent increase in the  
4 return on the market will result, on average, in a one percent increase in the return on the  
5 particular investment. An investment which has a beta less than 1.0 is considered to be less risky  
6 than the market.

7 The beta coefficient (" $\beta$ ") is the one input in the CAPM application which specifically  
8 applies to an individual firm, and is derived from a statistical analysis which regresses the returns  
9 on an individual security (dependent variable) with the returns on the market as a whole  
10 (independent variable). The beta coefficients for utility companies typically describe a small  
11 proportion of the total investment risk because the coefficients of determination ( $R^2$ ) are low.

12 Page 1 of Schedule 11 provides the adjusted betas published by Merrill Lynch and Value  
13 Line. By way of explanation, the Merrill Lynch beta coefficient is derived from a "straight  
14 regression" based upon the percentage change in the monthly price of common stock and the  
15 percentage change monthly of the S&P 500 Index using a five-year period. The raw historical  
16 beta is adjusted by Merrill Lynch for the measurement effect resulting in overestimates in high  
17 beta stocks and underestimates in low beta stocks. Value Line uses a similar approach and  
18 adjustment procedure to calculate its betas. The primary difference in the Value Line approach  
19 involves the use of rounding, weekly prices, and the New York Stock Exchange Composite  
20 Average in place of the S&P 500 Composite Index. Neither Merrill Lynch or Value Line  
21 considers dividends in the computation of their betas. I initially considered an average of the

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1 Merrill Lynch and Value Line betas. As shown on page 1 of Schedule 11, the average beta is  
2 .48 for the Water Group and .56 for the Public Utility Group.

3 **Q. What betas have you used in the CAPM determined cost of equity?**

4 A. As noted previously with regard to the DCF measure of the cost of equity, the betas must be  
5 reflective of the financial risk associated with the ratesetting capital structure that is measured  
6 at book value. To develop a CAPM cost rate applicable to a book value capital structure, the  
7 average of the Merrill Lynch and Value Line betas have been unleveraged and releveraged for  
8 the common equity ratios using book values. This adjustment has been made with the formula<sup>11</sup>:

$$\beta l = \beta u [1 + (1 - t) D/E + P/E]$$

9 where  $\beta l$  = the leveraged beta,  $\beta u$  = the unleveraged beta,  $t$  = income tax rate,  $D$  = debt ratio,  
10  $P$  = preferred stock ratio, and  $E$  = common equity ratio. As shown on page 1 of Schedule 11,  
11 these betas have been calculated with the market price of stock and therefore are related to the  
12 market value capitalization that contains a 63.62% and 66.24% common equity ratio,  
13 respectively for the Water Group and the Public Utility Group. By using the formula shown  
14 above and the capital structure ratios measured at their market values, the betas would become  
15 .35 for the Water Group and .42 for the Public Utility Group if they employed no leverage and  
16 were 100% equity financed. With the unleveraged beta, I have computed that the leveraged beta  
17 associated with the book value capital structure would be .61 for the Water Group and .70 for

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<sup>11</sup> R. Morin, Regulatory Finance: Utilities' Cost of Capital (1994). Hamada, "The Effect of the Firm's Capital Structure on the Systematic Risk of Common Stocks," The Journal of Finance (May 1972).

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the Public Utility Group. A summary of the betas and their corresponding common equity ratios are:

|                      | <u>Market Values</u> |                            | <u>Book Values</u> |                            |
|----------------------|----------------------|----------------------------|--------------------|----------------------------|
|                      | <u>Beta</u>          | <u>Common Equity Ratio</u> | <u>Beta</u>        | <u>Common Equity Ratio</u> |
| Water Group          | .48                  | 63.62%                     | .61                | 47.07%                     |
| Public Utility Group | .56                  | 66.24%                     | .70                | 49.19%                     |

The leveraged beta that I will employ in the CAPM cost of equity is .61 for the Water Group and .70 for the Public Utility Group.

**Q. What risk-free rate have you used in the traditional CAPM?**

**A.** The yield on long-term (i.e., 30-year) Treasury bonds represents the correct measure of the risk-free rate of return in the traditional CAPM. Regarding the risk-free rate of return, pages 2 and 3 of Schedule 11 provide the yields on the broad spectrum of Treasury Notes and Bonds. Some practitioners of the CAPM would advocate the use of short-term treasury yields (and some would argue for the yields on 91-day Treasury Bills). Other advocates of the CAPM would advocate the use of longer-term treasury yields as the best measure of a risk-free rate of return. As Ibbotson has indicated:

The Cost of Capital in a Regulatory Environment. When discounting cash flows projected over a long period, it is necessary to discount them by a long-term cost of capital. Additionally, regulatory processes for setting rates often specify or suggest that the desired rate of return for a regulated firm is that which would allow the firm to attract and retain debt and equity capital over the long term. Thus, the long-term cost of capital is typically the appropriate cost of capital to use in regulated ratesetting. (Stocks, Bonds, Bills and Inflation - 1992 Yearbook, pages 118-119)

## DIRECT TESTIMONY OF PAUL R. MOUL

1 As indicated above, 30-year Treasury Bond yields represent the correct measure of the risk-free  
2 rate of return in the traditional CAPM. Very short term yields on Treasury bills should be avoided  
3 for several reasons. First, rates should be set on the basis of financial conditions that will exist  
4 during the effective period of the proposed rates. Second, 91-day Treasury Bill yields are more  
5 volatile than longer-term yields and are greatly influenced by Fed monetary policy, political, and  
6 economic situations. Moreover, Treasury Bill yields have been shown to be empirically inadequate  
7 for the CAPM. Some advocates of the theory would argue that the risk-free rate of return in the  
8 CAPM should be derived from quality long-term corporate bonds.

9 In this regard, I have considered the yields on 30-year Treasury Bonds using both historical  
10 and forecast data. As shown on page 2 of Schedule 11, I have provided the historical yields on  
11 30-year Treasury bonds. The twelve month average yield on 30-year Treasury bonds was 5.99%  
12 as shown on page 3 of Schedule 11. Throughout 1999, Treasury yields moved generally higher.  
13 As noted previously, the strength of the U.S. economy, the apparent recovery of foreign  
14 economies, and concerns over future inflationary pressure have all contributed to rising interest  
15 rates. The Fed has reacted to these concerns by raising the Fed Funds rate five times since June  
16 1999. In fact, the yield on 30-year Treasury bonds increased from 5.37% in February 1999 to  
17 6.63% in January 2000.

18 As shown on page 4 of Schedule 11, forecasts published by Blue Chip Financial Forecasts  
19 on February 1, 2000 indicate that the yields on 30-year Treasury bonds are expected to be in the  
20 range of 6.4% to 6.2% during the next six quarters. To conform with the use of historical and

## DIRECT TESTIMONY OF PAUL R. MOUL

1 forecast data that I employed in my analysis, I have used a 6.25% yield for Treasury bonds as the  
2 risk-free rate of return in the CAPM.

3 **Q. What market premium have you used in the traditional CAPM?**

4 **A.** The final element necessary to apply the CAPM is the market premium. The market premium by  
5 definition is the rate of return on the total market less the risk-free rate of return (" $R_m - R_f$ "). In  
6 this regard, the market premium in the CAPM has been calculated from the total return on the  
7 market of equities using forecast and historical data. The future market return is established with  
8 forecasts by Value Line using dividend yields and capital appreciation potential.

9 With regard to the forecast data, I have relied upon the Value Line forecasts of capital  
10 appreciation and the dividend yield on the 1,700 stocks in the Value Line Survey. According to  
11 the February 4, 2000, edition of The Value Line Investment Survey Summary and Index, (see page  
12 5 of Schedule 11) the total return on the universe of Value Line equities is:

|                        | Dividend<br>Yield | + | Median<br>Appreciation<br>Potential | = | Median<br>Total<br>Return |
|------------------------|-------------------|---|-------------------------------------|---|---------------------------|
| As of February 4, 2000 | 2.2%              | + | 15.83% <sup>12</sup>                | = | 18.03%                    |

13  
14  
15  
16  
17  
18  
19 The tabulation shown above provides the dividend yield and capital gains yield of the companies  
20 followed by Value Line. With the 18.03% forecast market return and the 6.25% risk-free rate of  
21 return, an 11.78% (18.03% - 6.25%) market premium would be indicated using forecast market  
22 data.

---

<sup>12</sup> The estimated median appreciation potential is forecast to be 80% for 3 to 5 years hence. The annual capital gains yield at the midpoint of the forecast period is 15.83% i.e.,  $1.80^{.25} - 1$ .

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1 With regard to the historical data, I provided the rates of return from long-term historical  
2 time periods that have been widely circulated among the investment and academic community over  
3 the past several years, as shown on page 6 of Schedule 11. These data are published by Ibbotson  
4 Associates in its Stocks, Bonds, Bills and Inflation ("SBBI"). From the data provided on page 6  
5 of Schedule 11, I calculate a market premium using the common stock arithmetic mean returns  
6 of 13.3% less government bond arithmetic mean returns of 5.5%. For the period 1926-1999, the  
7 market premium was 7.8% (13.3% - 5.5%). I should note that the arithmetic mean must be used  
8 in the CAPM because it is a single period model. It is further confirmed by Ibbotson who has  
9 indicated:

### *Arithmetic Versus Geometric Differences*

12 For use as the expected equity risk premium in the CAPM, the *arithmetic* or  
13 *simple difference* of the *arithmetic* means of stock market returns and  
14 riskless rates is the relevant number. This is because the CAPM is an  
15 additive model where the cost of capital is the sum of its parts. Therefore,  
16 the CAPM expected equity risk premium must be derived by arithmetic, *not*  
17 *geometric*, subtraction.

### *Arithmetic Versus Geometric Means*

20 The expected equity risk premium should always be calculated using the  
21 arithmetic mean. The arithmetic mean is the rate of return which, when  
22 compounded over multiple periods, gives the mean of the probability  
23 distribution of ending wealth values....This makes the arithmetic mean return  
24 appropriate for computing the cost of capital. The discount rate that equates  
25 expected (mean) future values with the present value of an investment is that  
26 investment's cost of capital. The logic of using the discount rate as the cost  
27 of capital is reinforced by noting that investors will discount their (mean)  
28 ending wealth values from an investment back to the present using the  
29 arithmetic mean, for the reason given above. They will therefore require  
30 such an expected (mean) return prospectively (that is, in the present looking  
31 toward the future) to commit their capital to the investment. (Stocks, Bonds,  
32 Bills and Inflation - 1996 Yearbook, pages 153-154)

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For the CAPM, a market premium of 9.79% ( $7.8\% + 11.78\% \div 2$ ) would be reasonable, which is the average of 7.8% using historical data and 11.78% using forecasts. The resulting market premium represents the average market premium using the historical SBBI data and the forecasts by Value Line.

**Q. What result have you determined using the traditional CAPM?**

A. Using the 6.25% risk-free rate of return, the leverage adjusted beta of .61 for the Water Group, and 0.70 for the Public Utility Group, and the 9.79% market premium developed above, the following CAPM result is indicated.

$$R_f + b (R_m - R_f) = k$$

$$\text{Water Group} \quad 6.25\% + .61 (9.79\%) = 12.22\%$$

$$\text{Public Utility Group} \quad 6.25\% + .70 (9.79\%) = 13.10\%$$

Again, these results do not reflect the modification for flotation costs.

**Q. What rate of return is indicated from the CAPM?**

A. The CAPM result is 12.22% for the Water Group and 13.10% for the Public Utility Group. I should note that there will be an understatement of a firm's cost of equity with the CAPM unless the size of a firm is considered. That is to say, as the size of a firm decreases, its risk, and hence its required return increases. Moreover, in his discussion of the cost of capital, Professor Brigham has indicated that smaller firms have higher capital costs than otherwise similar larger firms (see Fundamentals of Financial Management, fifth edition, page 623). Also, the Fama/French study (see "The Cross-Section of Expected Stock Returns"; The Journal of Finance, June 1992) established that size of a firm helps explain stock returns. In an October 15,

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1 1995 article in Public Utility Fortnightly, it was demonstrated that the CAPM could understate  
2 the cost of equity significantly according to a company's size. This was further demonstrated in  
3 the SBBI Yearbook which indicated that the returns for stocks in lower deciles (i.e., smaller  
4 stocks) had returns in excess of those shown by the simple CAPM. In this regard, the Water  
5 Group had an average market capitalization of its equity of \$639 million which would place it  
6 in the sixth decile according to the size of the companies traded on the New York Stock  
7 Exchange. Therefore, the Water Group must be viewed as a portfolio of low-cap companies  
8 consisting of those in the 6th through 8th deciles with market capitalization between \$215 million  
9 and \$872 million. This would indicate a size premium of 0.84% above the CAPM cost rate for  
10 the low-cap companies according to the SBBI 1999 Yearbook. The CAPM results would be  
11 13.06% (12.22% + 0.84%) with the size adjustment for the Water Group. For the Public Utility  
12 Group, their market capitalization was \$1,196 million which places them in the mid-cap group  
13 consisting of the 3rd to 5th declines having a market capitalization between \$872 million and  
14 \$4,222 million. The adjustment for mid-cap stocks would provide a CAPM of 13.29% (13.10%  
15 + 0.19%) for the Public Utility Group. Absent such an adjustment, the CAPM would understate  
16 the required return unless the average size of the Water Group and Public Utilities Group is  
17 considered.

## COMPARABLE EARNINGS APPROACH

18  
19 **Q.** How have you applied the Comparable Earnings approach in this case?

20 **A.** In order to identify the appropriate return on equity for a utility, it is necessary to analyze returns  
21 experienced by other firms within the context of the Comparable Earnings standard. The firms

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1 selected for the Comparable Earnings approach should be companies whose prices are not  
2 subject to cost-based price ceilings (i.e., non-regulated firms) so that circularity is avoided.  
3 Because regulated firms must compete with non-regulated firms in the capital markets, it is  
4 appropriate, if not necessary, to view the returns experienced by firms which operate in  
5 competitive markets. One must keep in mind that the rates of return for non-regulated firms  
6 represent results on book value actually achieved or expected to be achieved because the starting  
7 point of the calculation is the actual experience of companies that are not subject to rate  
8 regulation. As established in the Hope case:

9 [T]he return to the equity owner should be commensurate with returns  
10 on investments in other enterprises having corresponding risks. That  
11 return, moreover, should be sufficient to assure confidence in the  
12 financial integrity of the enterprise, so as to maintain its credit and to  
13 attract capital.

14  
15 Therefore, it is important to identify the returns earned by firms which compete for capital with  
16 utilities. This can be accomplished by analyzing the returns for non-regulated firms which are  
17 subject to the competitive forces of the marketplace.

18 There are two avenues available to implement the Comparable Earnings approach. One  
19 method would involve the selection of another industry (or industries) with comparable risks to  
20 the utility in question, and the results for all companies within that industry would serve as a  
21 benchmark. The second approach requires the selection of parameters which represent similar  
22 risk traits for the utility and the comparable risk companies. Using this approach, the business  
23 lines of the comparable companies become unimportant. The latter approach is preferable with  
24 the further qualification that the comparable risk companies exclude regulated firms. As such,

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1       this approach to Comparable Earnings avoids the circular reasoning implicit in the use of the  
2       achieved earnings/book ratios of other regulated firms. Rather, it provides an indication of an  
3       earnings rate derived from non-regulated companies which are subject to competition in the  
4       marketplace and not rate regulation. Because, regulation is a substitute for competitively-  
5       determined prices, the returns realized by non-regulated firms with comparable risks to a public  
6       utility provide useful insight into a fair rate of return. This is because returns realized by non-  
7       regulated firms have become increasingly relevant with the trend toward increased risk  
8       throughout the public utility business. Moreover, the rate of return for a regulated public utility  
9       must be competitive with returns available on investments in other enterprises having  
10      corresponding risks, especially in a more global economy.

11           To identify the comparable risk companies, the Value Line Data Base for Windows was  
12      used to screen for firms of comparable risks. The Value Line Data Base includes data on  
13      approximately 1700 firms. Excluded from the selection process were companies with a foreign  
14      exchange listing and master limited partnerships (MLPs).

15           Value Line's risk analysis of these firms includes a wide range of financial and market  
16      variables, including ten items available that provide ratings and estimates for each company.  
17      From these ten items, I removed two categories dealing with industry type because, under my  
18      approach, the particular business type is not significant. In addition, I removed, two categories  
19      dealing with estimates of earnings and dividends because they are not useful for comparative  
20      purposes. The remaining six categories provide relevant measures to establish comparability.

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The definitions for each of the six criteria (from the Value Line Investment Survey - Subscriber Guide) follows:

### Timeliness Rank

The rank for a stock's probable relative market performance in the year ahead. Stocks ranked 1 (Highest) or 2 (Above Average) are likely to outpace the year-ahead market. Those ranked 4 (Below Average) or 5 (Lowest) are not expected to outperform most stocks over the next 12 months. Stocks ranked 3 (Average) will probably advance or decline with the market in the year ahead. Investors should try to limit purchases to stocks ranked 1 (Highest) or 2 (Above Average) for Timeliness.

### Safety Rank

A measure of potential risk associated with individual common stocks rather than large diversified portfolios (for which Beta is good risk measure). Safety is based on the stability of price, which includes sensitivity to the market (see Beta) as well as the stock's inherent volatility, adjusted for trend and other factors including company size, the penetration of its markets, product market volatility, the degree of financial leverage, the earnings quality, and the overall condition of the balance sheet. Safety Ranks range from 1 (Highest) to 5 (Lowest). Conservative investors should try to limit purchases to equities ranked 1 (Highest) or 2 (Above Average) for Safety.

### Financial Strength

The financial strength of each of the more than 1,600 companies in the VS II data base is rated relative to all the others. The ratings range from A++ to C in nine steps. (For screening purposes, think of an A rating as "greater than" a B). Companies that have the best relative financial strength are given an A++ rating, indicating an ability to weather hard times better than the vast majority of other companies. Those who don't quite merit the top rating are given an A+ grade, and so on. A rating as low as C++ is considered satisfactory. A rating of C+ is well below average, and C is reserved for companies with very serious financial problems. The ratings are based upon a computer analysis of a number of key variables that determine (a) financial leverage, (b) business risk, and (c) company size, plus the judgment of Value Line's analysts and senior editors regarding factors that cannot be quantified across-the-

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1 board for companies. The primary variables that are indexed and studied  
2 include equity coverage of debt, equity coverage of intangibles, "quick  
3 ratio", accounting methods, variability of return, fixed charge coverage,  
4 stock price stability, and company size.

### 5 6 Price Stability Index

7  
8 An index based upon a ranking of the weekly percent changes in the price  
9 of the stock over the last five years. The lower the standard deviation of  
10 the changes, the more stable the stock. Stocks ranking in the top 5%  
11 (lowest standard deviations) carry a Price Stability Index of 100; the next  
12 5%, 95; and so on down to 5. One standard deviation is the range  
13 around the average weekly percent change in the price that encompasses  
14 about two thirds of all the weekly percent change figures over the last  
15 five years. When the range is wide, the standard deviation is high and the  
16 stock's Price Stability Index is low.

### 17 18 Beta

19  
20 A measure of the sensitivity of the stock's price to overall fluctuations in  
21 the New York Stock Exchange Composite Average. A Beta of 1.50  
22 indicates that a stock tends to rise (or fall) 50% more than the New York  
23 Stock Exchange Composite Average. Use Beta to measure the stock  
24 market risk inherent in any diversified portfolio of, say, 15 or more  
25 companies. Otherwise, use the Safety Rank, which measures total risk  
26 inherent in an equity, including that portion attributable to market  
27 fluctuations. Beta is derived from a least squares regression analysis  
28 between weekly percent changes in the price of a stock and weekly  
29 percent changes in the NYSE Average over a period of five years. In the  
30 case of shorter price histories, a smaller time period is used, but two  
31 years is the minimum. The Betas are periodically adjusted for their long-  
32 term tendency to regress toward 1.00.

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### Technical Rank

A prediction of relative price movement, primarily over the next three to six months. It is a function of price action relative to all stocks followed by Value Line. Stocks ranked 1 (Highest) or 2 (Above Average) are likely to outpace the market. Those ranked 4 (Below Average) or 5 (Lowest) are not expected to outperform most stocks over the next six months. Stocks ranked 3 (Average) will probably advance or decline with the market. Investors should use the Technical and Timeliness Ranks as complements to one another.

In order to implement the Comparable Earnings approach, these screening criteria were used to establish a range as defined by the rankings of the component companies in the Water and Public Utility Groups. The items considered were: Timeliness Rank, Safety Ranking, Financial Strength, Price Stability, Value Line betas, and Technical Rank. The identities of companies comprising the Comparable Earnings group and their associated rankings within the ranges are identified on pages 1 through 3 of Schedule 12.

Value Line data was relied upon because it provides a comprehensive basis for evaluating the risks of the comparable firms. As to the returns calculated by Value Line for these companies, there is some downward bias in the figures shown on pages 4 through 6 of Schedule 12 because Value Line computes the returns on year-end rather than average book value. If average book values had been employed, the rates of return would have been slightly higher. Nevertheless, these are the returns considered by investors when taking positions in these stocks. Finally, because many of the comparability factors, as well as the published returns, are used by investors for selecting stocks, and to the extent that investors rely on the Value Line service to gauge their returns, it is, therefore, an appropriate data base for measuring comparable return opportunities. To implement the Comparable Earnings approach, I have used both historical

## DIRECT TESTIMONY OF PAUL R. MOUL

1 realized returns and forecast returns for non-utility companies. It is appropriate to consider a  
2 relatively long measurement period in the Comparable Earnings approach in order to cover  
3 conditions over an entire business cycle. A ten year period (5 historical years and 5 projected  
4 years) is sufficient to cover an average business cycle<sup>13</sup>. The results of the Comparable Earnings  
5 method can be applied directly to an original cost rate base because the nature of the analysis  
6 relates to book value. Hence, Comparable Earnings does not contain the potential  
7 misspecification contained in market models when prices and book values diverge significantly.

8 **Q. What are the results of your Comparable Earnings approach?**

9 A. As shown on page 6 of Schedule 12, the historical rate of return on book common equity was  
10 15.8% using the average measure of central tendency and 12.7% using the median value. The  
11 forecast rate of return as published by Value Line is shown by the 15.7% average and 14.0%  
12 median value also provided on page 6 of Schedule 12.

13 **Q. What rate of return on common equity have you determined in this case using the**  
14 **Comparable Earnings approach?**

15 A. The average of the historical and forecast median rates of return is 13.35% ( $12.7\% + 14.0\% =$   
16  $26.7\% \div 2$ ) and represents the Comparable Earnings result for this case.

## CONCLUSION

17  
18 **Q. How should the Commission approach the issue of the cost of equity for the Company in**  
19 **this case?**

---

<sup>13</sup> For example, since 1854, there have been 30 business cycles having an average length of 51 months measured from trough to trough and 54 months measured from peak to peak. Hence, a 10-year measurement period in the Comparable Earnings approach is more than adequate to cover an average business cycle.

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1    A.   In reaching a determination of the cost of equity, the Commission should consider the results of  
2       a variety of methods/models. In addition, it is important to recognize that M&A activity is  
3       providing a distorted measure of the cost of equity for water companies when using the DCF  
4       model. Finally, the Commission should recognize that the market-based measures of the cost  
5       of equity when applied to a book value rate base must be adjusted in order to provide the  
6       Company with a fair rate of return that reflects its risks.

7    Q.   Does this conclude your prepared direct testimony?

8    A.   Yes.

1                   **EDUCATIONAL BACKGROUND, BUSINESS EXPERIENCE**  
2                   **AND QUALIFICATIONS**

3           I was awarded a degree of Bachelor of Science in Business Administration by Drexel  
4   University in 1971. While at Drexel, I participated in the Cooperative Education Program which  
5   included employment, for one year, with American Water Works Service Company, Inc., as an  
6   internal auditor, where I was involved in the audits of several operating water companies of the  
7   American Water Works System and participated in the preparation of annual reports to regulatory  
8   agencies and assisted in other general accounting matters.

9           Upon graduation from Drexel University, I was employed by American Water Works  
10   Service Company, Inc., in the Eastern Regional Treasury Department where my duties included  
11   preparation of rate case exhibits for submission to regulatory agencies, as well as responsibility for  
12   various treasury functions of the thirteen New England operating subsidiaries.

13          In 1973, I joined the Municipal Financial Services Department of Betz Environmental  
14   Engineers, a consulting engineering firm, where I specialized in financial studies for municipal water  
15   and sewer systems.

16          In 1974, I joined Associated Utility Services, Inc., now known as AUS Consultants. I held  
17   various positions with the Utility Services Group of AUS Consultants, concluding my employment  
18   there as a Senior Vice President.

19          In 1994, I formed P. Moul & Associates, an independent financial and regulatory consulting  
20   firm. In my capacity as Managing Consultant and for the past twenty-five years, I have continuously  
21   studied the rate of return requirements for cost of service regulated firms. In this regard, I have  
22   supervised the preparation of rate of return studies which were employed in connection with my

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1 testimony and in the past for other individuals. I have presented direct testimony on the subject of  
2 fair rate of return, evaluated rate of return testimony of other witnesses, and presented rebuttal  
3 testimony.

4 My studies and prepared direct testimony have been presented before twenty-eight (28)  
5 federal, state and municipal regulatory commissions, consisting of: the Federal Energy Regulatory  
6 Commission; state public utility commissions in Alabama, Connecticut, Delaware, Florida, Georgia,  
7 Hawaii, Illinois, Indiana, Iowa, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota,  
8 Missouri, New Hampshire, New Jersey, New York, North Carolina, Ohio, Tennessee, Pennsylvania,  
9 South Carolina, Virginia, and West Virginia; and the Philadelphia Gas Commission. My testimony  
10 has been offered in over 200 rate cases involving electric power, natural gas distribution and  
11 transmission, resource recovery, solid waste collection and disposal, telephone, wastewater, and  
12 water service utility companies. While my testimony has involved principally fair rate of return and  
13 financial matters, I have also testified on capital allocations, capital recovery, cash working capital,  
14 income taxes, factoring of accounts receivable, and take-or-pay expense recovery. My testimony  
15 has been offered on behalf of municipal and investor-owned public utilities and for the staff of a  
16 regulatory commission. I have also testified at an Executive Session of the State of New Jersey  
17 Commission of Investigation concerning the BPU regulation of solid waste collection and disposal.

18 I was a co-author of a verified statement submitted to the Interstate Commerce Commission  
19 concerning the 1983 Railroad Cost of Capital (Ex Parte No. 452). I was also co-author of  
20 comments submitted to the Federal Energy Regulatory Commission regarding the Generic  
21 Determination of Rate of Return on Common Equity for Public Utilities in 1985, 1986 and 1987  
22 (Docket Nos. RM85-19-000, RM86-12-000, RM87-35-000 and RM88-25-000). Further, I have

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1 been the consultant to the New York Chapter of the National Association of Water Companies  
2 which represented the water utility group in the Proceeding on Motion of the Commission to  
3 Consider Financial Regulatory Policies for New York Utilities (Case 91-M-0509). Recently, I have  
4 submitted comments to the Federal Energy Regulatory Commission in its Notice of Proposed  
5 Rulemaking (Docket No. RM99-2-000) concerning Regional Transmission Organizations and on  
6 behalf of the Edison Electric Institute in its intervention in the case of Southern California Edison  
7 Company (Docket No. ER97-2355-000).

8 In late 1978, I arranged for the private placement of bonds on behalf of an investor-owned  
9 public utility. I have assisted in the preparation of a report to the Delaware Public Service  
10 Commission relative to the operations of the Lincoln and Ellendale Electric Company. I was also  
11 engaged by the Delaware P.S.C. to review and report on the proposed financing and disposition of  
12 certain assets of Sussex Shores Water Company (P.S.C. Docket Nos. 24-79 and 47-79). I was a  
13 co-author of a Report on Proposed Mandatory Solid Waste Collection Ordinance prepared for the  
14 Board of County Commissioners of Collier County, Florida.

15 I have been a consultant to the Bucks County Water and Sewer Authority concerning rates  
16 and charges for wholesale contract service with the City of Philadelphia. My municipal consulting  
17 experience also included an assignment for Baltimore County, Maryland, regarding the City/County  
18 Water Agreement for Metropolitan District customers (Circuit Court for Baltimore County in Case  
19 34/153/87-CSP-2636).

20 I am a member of the Society of Utility and Regulatory Financial Analysis (formerly the  
21 National Society of Rate of Return Analysts) and have attended several Financial Forums sponsored  
22 by the Society. I attended the first National Regulatory Conference at the Marshall-Wythe School

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of Law, College of William and Mary. I also attended an Executive Seminar sponsored by the Colgate Darden Graduate Business School of the University of Virginia concerning Regulated Utility Cost of Equity and the Capital Asset Pricing Model. In October 1984, I attended a Standard & Poor's Seminar on the Approach to Municipal Utility Ratings, and in May 1985, I attended an S&P Seminar on Telecommunications Ratings.

My lecture and speaking engagements include:

| <u>Date</u>   | <u>Occasion</u>                                 | <u>Sponsor</u>  |
|---------------|---|---|
| February 2000 | The Sixth Annual FERC Briefing                  | Exnet and Bruder, Gentile & Marcoux, LLP  |
| March 1994    | Seventh Annual Proceeding                       | Electric Utility Business Environment Conference  |
| May 1993      | Financial School                                | New England Gas Assoc.  |
| April 1993    | Twenty-Fifth Financial Forum                    | National Society of Rate of Return Analysts   |
| June 1992     | Rate and Charges Subcommittee Annual Conference | American Water Works Association  |
| May 1992      | Rates School                                    | New England Gas Assoc.  |
| October 1989  | Seventeenth Annual Eastern Utility Rate Seminar | Water Committee of the National Association of Regulatory Utility Commissioners   |
|               |   | Florida Public Service Service Commission and University of Utah  |
| October 1988  | Sixteenth Annual Eastern Utility Rate Seminar   | Water Committee of the National Association of Regulatory Utility Commissioners, Florida Public Service Commission and University of Utah |
| May 1988      | Twentieth Financial Forum                       | National Society of Rate of Return Analysts   |
| October 1987  | Fifteenth Annual Eastern Utility Rate Seminar   | Water Committee of the National Association of Regulatory Utility Commissioners, Florida  |

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|    |                |                     |                           |
|----|----------------|---------------------|---------------------------|
| 1  |                |                     | Public Service Commis-    |
| 2  |                |                     | sion and University of    |
| 3  |                |                     | Utah                      |
| 4  | September 1987 | Rate Committee      | American Gas Association  |
| 5  |                | Meeting             |                           |
| 6  | May 1987       | Pennsylvania        | National Association of   |
| 7  |                | Chapter             | Water Companies           |
| 8  |                | annual meeting      |                           |
| 9  | October 1986   | Eighteenth          | National Society of Rate  |
| 10 |                | Financial           | of Return                 |
| 11 |                | Forum               |                           |
| 12 | October 1984   | Fifth National      | American Bar Association  |
| 13 |                | on Utility          |                           |
| 14 |                | Ratemaking          |                           |
| 15 |                | Fundamentals        |                           |
| 16 | March 1984     | Management Seminar  | New York State Telephone  |
| 17 |                |                     | Association               |
| 18 | February 1983  | The Cost of Capital | Temple University, School |
| 19 |                | Seminar             | of Business Admin.        |
| 20 | May 1982       | A Seminar on        | New Mexico State          |
| 21 |                | Regulation          | University, Center for    |
| 22 |                | and The Cost of     | Business Research         |
| 23 |                | Capital             | and Services              |
| 24 | October 1979   | Economics of        | Brown University          |
| 25 |                | Regulation          |                           |